

Water and Organic Material in Icy Minor Bodies of the Outer Solar System

Audrey .C. Delsanti
Institute for Astronomy
NAI – University of Hawaii
2680 Woodlawn Drive, Honolulu, Hawaii 96822
USA
delsanti@ifa.hawaii.edu

Catherine de Bergh
LESIA
Observatoire de Paris-Meudon
FRANCE

James M. Bauer
Jet Propulsion Laboratory
USA

Lysa J. Chizmadia
Institute for Astronomy
NAI – University of Hawaii
USA

Karen J. Meech
Institute for Astronomy
NAI – University of Hawaii
USA

Approximately 1000 minor bodies are now known to orbit in the outer parts of our solar system, beyond Neptune. These objects (also known as Kuiper Belt Objects, KBOs) are probably composed of a mixture of ice and dust, and wander in regions where the temperature ranges from ~30 to 60K. Their typical size is about 100km in diameter and the largest objects can reach more than 1000km in diameter. With the use of new observing technologies, it is possible to start studying the physical properties of these objects. KBOs display an amazing diversity of surface composition, and some of them show some evidence for the presence of water ice and organic material. In this paper, we will review the current knowledge of the surface composition of KBOs. Some of the objects contain some material very similar to terrestrial kerogens, silicates (as in meteorites) and also water ice. Very recently, Jewitt and Luu (2004) discovered crystalline water ice on the KBO Quaoar. This discovery brings new constraints on the thermal history of the outer solar system. If confirmed on other objects, this discovery opens new amazing perspectives on the water history of our solar system. In this paper, we will also present new results on the detection of water ice on Orcus, one of the largest KBOs.

In addition, we will detail the IFA-NAI project on water and organic material in icy minor bodies of the outer solar system and its connections to other disciplines.